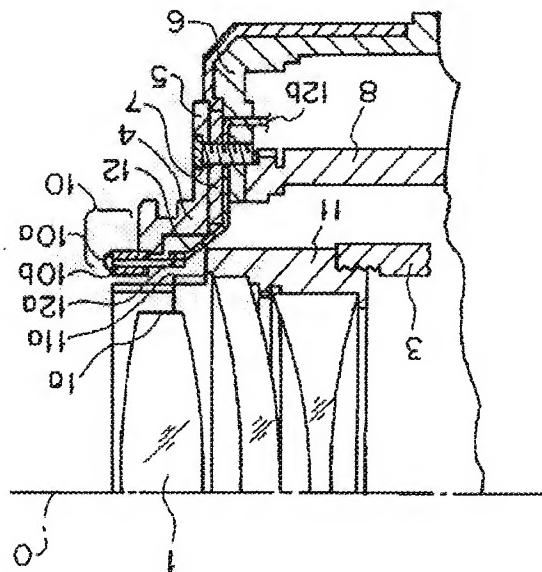


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(54) [說明の名稱] 設備名稱

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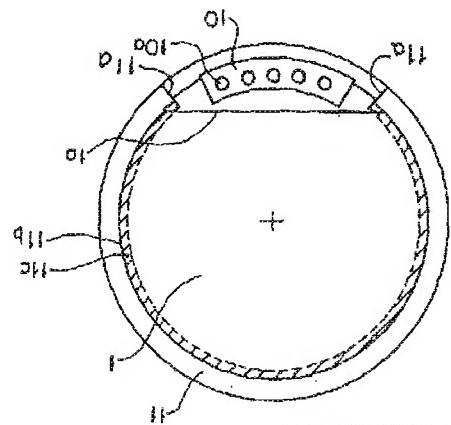
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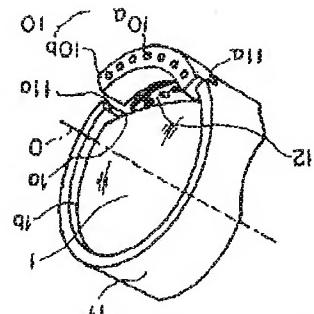
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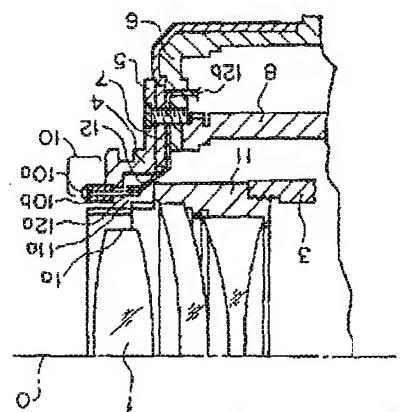
[Drawing 7]



[Drawing 3]



[Drawing 2]



[0006] Made in order that this invention might solve above-mentioned fault, the purpose is to provide the interchangeable lens which arranges efficiently connecting members, such as a mount contact member and a diaphragm driving member, and does not enlarge them in the interchangeable lens of a lens of large diameter in particular.

[0007] Means for Solving the Problem and its Function[In an interchangeable lens which can detach and attach an interchangeable lens of this invention freely to a camera body, A lens optical system provided in a lens nearest to lens side mount which has the lens notch section film, and this lens notch section connects with the above-mentioned camera body at least, When it is provided in both notch sections of a lens holding frame with a frame with a frame notch section, and the above-mentioned lens and a lens holding frame and the above-mentioned system, and the above-mentioned lens provided in a position corresponding to a notch section of the above-mentioned lens optical camera body is equipped, a predetermined member of a camera body and a combinable connecting member are provided. In the above-mentioned interchangeable lens, a predetermined lens member in a lens by the side of the above-mentioned lens mount, and both frame notch circumference of mount of member of a camera body can be performed by a provided connecting member seen from the mount side of the above-mentioned interchangeable lens. The outside member seen from the mount side of a back lens mounting rim 1 as a lens holding very back, i.e., camera body, side inserted in the back lens mounting rim 1 is allocated in the [0008] As shown in above-mentioned drawing 1, the after-above ball lens 1 is allocated in the mounting rim 1 is driven according to the cam mechanism which is not illustrated. mount 4 where the spacer 7 is inserted to fixed frame B6, the screw stop of the lens mount 4 as lens side mount of the above-mentioned interchangeable lens is carried out.

[0010] Where the camera body side mount which is not illustrated and combination are enabled.

FNo. of a lens-of-large-diameter body tube could not be made small to the minimum.

[0006] Made in order that this invention might solve above-mentioned fault, the purpose is to provide the interchangeable lens which arranges efficiently connecting members, such as a mount contact member and a diaphragm driving member, and does not enlarge them in the interchangeable lens of a lens of large diameter in particular.

[0007] Means for Solving the Problem and its Function[In an interchangeable lens which can detach and attach an interchangeable lens of this invention freely to a camera body, A lens optical system provided in a lens nearest to lens side mount which has the lens notch section film, and this lens notch section connects with the above-mentioned camera body at least, When it is provided in both notch sections of a lens holding frame with a frame with a frame notch section, and the above-mentioned lens and a lens holding frame and the above-mentioned system, and the above-mentioned lens provided in a position corresponding to a notch section of the above-mentioned lens optical camera body is equipped, a predetermined member of a camera body and a combinable connecting member are provided. In the above-mentioned interchangeable lens, a predetermined lens member in a lens by the side of the above-mentioned lens mount, and both frame notch circumference of mount of member of a camera body can be performed by a provided connecting member seen from the mount side of the above-mentioned interchangeable lens. The outside member seen from the mount side of a back lens mounting rim 1 as a lens holding very back, i.e., camera body, side inserted in the back lens mounting rim 1 is allocated in the [0008] As shown in above-mentioned drawing 1, the after-above ball lens 1 is allocated in the mounting rim 1 is driven according to the cam mechanism which is not illustrated. mount 4 where the spacer 7 is inserted to fixed frame B6, the screw stop of the lens mount 4 as lens side mount of the above-mentioned interchangeable lens is carried out.

[0010] Where the camera body side mount which is not illustrated and combination are enabled.

FNo. of a lens-of-large-diameter body tube could not be made small to the minimum.

[0006] Made in order that this invention might solve above-mentioned fault, the purpose is to provide the interchangeable lens which arranges efficiently connecting members, such as a mount contact member and a diaphragm driving member, and does not enlarge them in the interchangeable lens of a lens of large diameter in particular.

[0007] Means for Solving the Problem and its Function[In an interchangeable lens which can detach and attach an interchangeable lens of this invention freely to a camera body, A lens optical system provided in a lens nearest to lens side mount which has the lens notch section film, and this lens notch section connects with the above-mentioned camera body at least, When it is provided in both notch sections of a lens holding frame with a frame with a frame notch section, and the above-mentioned lens and a lens holding frame and the above-mentioned system, and the above-mentioned lens provided in a position corresponding to a notch section of the above-mentioned lens optical camera body is equipped, a predetermined member of a camera body and a combinable connecting member are provided. In the above-mentioned interchangeable lens, a predetermined lens member in a lens by the side of the above-mentioned lens mount, and both frame notch circumference of mount of member of a camera body can be performed by a provided connecting member seen from the mount side of the above-mentioned interchangeable lens. The outside member seen from the mount side of a back lens mounting rim 1 as a lens holding very back, i.e., camera body, side inserted in the back lens mounting rim 1 is allocated in the [0008] As shown in above-mentioned drawing 1, the after-above ball lens 1 is allocated in the mounting rim 1 is driven according to the cam mechanism which is not illustrated. mount 4 where the spacer 7 is inserted to fixed frame B6, the screw stop of the lens mount 4 as lens side mount of the above-mentioned interchangeable lens is carried out.

[0010] Where the camera body side mount which is not illustrated and combination are enabled.

The above-mentioned spacer 7 is a member for performing focus adjustment (focus control) of an interchangeable lens, and the thinning of various board thicknesses is prepared. Although the graphic display has not been carried out, a cam groove is cut toward a tip part, and the fixed frame A8 serves to let out the above-mentioned movable frame 3 with the cam groove of the cam ring which is not illustrated.

[0011] In the resin part 10b of an insulator, the mount contact member 10 as a connecting member currently fixed to the above-mentioned lens mount 4 by a screw stop or adhesion as shown in above-mentioned drawing 1 carries out insert molding of the point pin 10a, and is formed. With solder, as for the flexible printed circuit board 12 which is an object for connection with the circuit in the above-mentioned interchangeable lens, one end 12a is being fixed to the back ball lens 1 is cut by the cutting portion 1a in the shape of D type in the part. If it shall carry out after core picking of a lens in the lens of glass, since it comes out with sufficient accuracy to the periphery (1b) into which the core of the lens is not cut, cutting processing of the shape of this D type is convenient. Of course, in the case of the lens made from a plastic, the cutting portion 1a may be formed with shaping. The notch section 1a is formed in the position corresponding to the cutting portion 1a of the after-above ball lens 1 also in the after-above lens mounting rim 11. And said mount contact member 10 is the lower part of the cutting portion 1a of the ball lens 1 after this, and it is fixed to the above-mentioned lens mount 4 so that it may be located in the space formed in both the notch sections 1a of the back lens mounting rim 11.

[0012] As shown in the back lens mounting rim 11 of the interchangeable lens of this example of above-men tioned drawing 2, and the perspective view of the mount contact member 10, the back ball lens 1 is cut by the cutting portion 1a in the shape of D type in the part. If it shall carry out after core picking of a lens in the lens of glass, since it comes out with sufficient accuracy in the space formed in both the notch sections 1a of the back lens mounting rim 11 of the after-above ball lens 1 is shaved off with milling, and is formed.

[0013] The after-above ball lens 1 is fixed by adhesion etc. to the after-above lens mounting rim 11. And said mount contact member 10 is the lower part of the cutting portion 1a of the ball lens 1 after this, and it is fixed to the above-mentioned lens mount 4 so that it may be located in the space formed in both the notch sections 1a of the back lens mounting rim 11.

[0014] Drawing 3 is the after-above ball lens 1, the back lens mounting rim 11, and the figure in the figure that looked at the mount contact member 10 from the direction of the lens mount 5 in the interchangeable lens of this example. The abutting-joint part 1c for inserting and positioning the back ball lens 1 is formed in the back lens mounting rim 11 with the inside diameter smaller than the diameter 1b of fitting of the back ball lens 1. Since there is the cutting one step than the diameter 1b of fitting of the back ball lens 1, the back ball lenses, and problems, such as attachment inclination of the after-above ball lens about 270 degrees, and the notching section 1a is formed also in the back lens mounting rim 11, the abutting-joint part 1c of the back lens back ball lens 1, the perimeter will not contact on the abutting-joint part 1c of the back lens show, and the notch section 1a is formed also in the back lens mounting rim 11, as for the portion 1a mentioned above in the back ball lens 1 so that above-men tioned drawing 3 may

[0029] Drawing 10 is ***** about the shape of the modification of the back ball lens of the interchangeable lens of the 3rd above-mentioned example. In this modification, as the cutting portion 41a of the back ball lens 41 shows drawing 10, it has amounted to three places. By this cutting, the connecting member which projects from the inside of a lens barrel to lens-side- portion 41a of the back ball lens 41 shows drawing 10, it has amounted to three places. By this interchangingable lens of the 3rd above-mentioned example. In this modification, as the cutting [0029] Drawing 10 is ***** about the shape of the modification of the back ball lens of the

not produce the problem of the position accuracy of the back ball lens 21. Positioning to the back lens mounting rim 31 is possible for the back ball lens 21, and it does not produce the problem of the position accuracy of the back ball lens 21.

[0028] The periphery 21b of the back ball lens 21 is left behind to the symmetric position to the center to such an extent that it is shown in above-mentioned drawing 9, although the back ball lens 21 is having the abbreviated symmetric position cut by the two cutting portions 21a as mentioned above.

[0027] With the interchangeable lens of this example, the member which projects from the inside of a lens barrel to lens mount back can be arranged to two places by forming the cutting portion 21a and the notch section 31a as mentioned above. For example, as shown in above-mentioned drawing 9, to the figure down side, the mount contact member 10 as a connecting member shown with the interchangeable lens of said 1st example can be arranged, and the lever 18 for a diaphragm drive as a connecting member shown with the interchangeable lens [0027] With the interchangeable lens of this example, the member which projects from the inside of a lens barrel to lens mount back can be arranged to the up side.

[0026] On the back ball lens 21 nearest to the lens mount side which is a lens, among the lens optical axis O corresponding to the position of the cutting portion 21a.

[0026] In the figure of drawing 9, as for the notch section 31a of those with two place, and the back lens mounting rim 31, the two cutting portions 21a are formed in the abbreviated position of symmetry to the drawing 9, as for the notch section 31a of those with two place, and the back lens mounting

[0025] Next, the interchangeable lens which can be freely detached and attached to the camera body as the 3rd example of this invention is explained. Drawing 9 is the figure which looked at lenses as well as the thinning of said example be a large-sized thing. Also in the interchangeable lens of this example, the same numerals as the numbers given to the thinning of said the 1st and 2 examples are used about an identical configuration member.

[0025] In the interchangeable lens of this example also has small Fno., and let the outside of a back ball lens as well as the thinning of said example be a large-sized thing. Also in the interchangeable lens of this example, the same numerals as the numbers given to the thinning of said the 1st and 2 examples are used about an identical configuration member.

[0025] In the state where it is not affected, the lever 18 for a drive can be arranged, and a screen in the state where it is not affected, the lever 18 for a drive can be arranged, and a small and compact interchangeable lens can be provided. It replaces with the above- mentioned lever for a diaphragm drive, and may be made to allocate other driving operation members.

notch section 11a of a back lens mounting rim arrange, as explained above according to the interchangeable lens of this example, without extending a body tube outside, even if the back ball lens 1 is large and it is a small lens of large diameter of Fno., it can extract to the photoed screen in the state where it is not affected, the lever 18 for a drive can be arranged, and a small and compact interchangeable lens can be provided. It replaces with the above-

[Translation done.]

[0032] [Effect of the invention] in the interchangable lens of this invention according to claim 1, Some lenses nearest to lens side mount among two or more lenses of the lens optical system in an interchangable lens body Notching, Since the connecting member was arranged to the space which provided the frame notch section also in the lens holding frame, and was made by these notch sections at it, The space in an interchangable lens body tube can be used efficiently, enlarging lens barrel outside type more than needed is avoided, and it can provide a small and compact interchangable lens.

[0033] In the interchangable lens of this invention according to claim 2, The lens near the mount side of the lens optical system of the interchangable lens of a statement and notching connecting member can be allocated in the portion, and enlargement of a lens barrel can be avoided.

[0034] In the interchangable lens of this invention according to claim 3, it becomes possible to avoid enlargement of a lens barrel by arranging a mount contact member or a diaphragm driving member to the space made to above-mentioned claim 1 by the notch section in the interchangable lens of a statement.

-- it can ** .

[0032]

[0031] Although the interchangable lens of the 1st, 2, and 3 example explained until now was shown as what carmed out all cuttings of the back ball lens to linear shape, cutting into the shape of the member arranged to the space, or the shape which is different from a point of the cost of processing, for example, cutting in the shape of a curve, and acquiring the further effect side is attained in three kinds of connecting members, for example, a control lever, a mount too as compared with the thing of said the 1st and 2 example, allocation to the lens-side-mount if it is in the lens of this modification, even if it is a lens of the small large caliber of Fno. with sufficient accuracy to the back lens mounting rim which is not illustrated.

circumference 3 division into equal parts as the lens periphery 41b illustrated, it can position of the back ball lens 41, since it is in the three places of the direction of approximate circle mount back can be arranged to three places. About positioning to the back lens mounting rim

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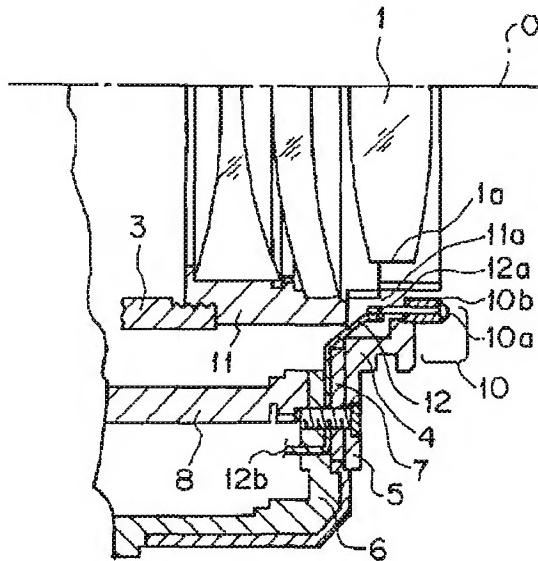
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(54) 【発明の名称】 交換レンズ

(57) 【要約】

【目的】 後玉径の大きいレンズを持つ交換レンズにおいて、後玉枠および後玉に対してマウント接点部材、絞り駆動部材等の連結部材を効率よく配置し、大型化することのないものを提供する。

【構成】 着脱自在な交換レンズにおいて、レンズ側マウントに最も近いレンズであって、レンズ切り欠き部1aを有する後玉レンズ1と、上記切り欠き部1aに対応する位置に設けられた枠切り欠き部11aを有するレンズ保持枠11と、上記レンズ、および、レンズ保持枠11の両切り欠き部11a内に設けられていて、カメラ本体に装着された際に、カメラ本体の所定の部材と結合可能なマウント接点部材10を具備している。



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【特許請求の範囲】

【請求項1】 カメラ本体に着脱自在な交換レンズにおいて、

フィルムへの結像に寄与する範囲以外の所定の部位に設けられたレンズ切り欠き部を有し、該レンズ切り欠き部が少なくとも上記カメラ本体と接続するレンズ側マウントに最も近いレンズに設けられたレンズ光学系と、上記レンズ光学系の切り欠き部に対応する位置に設けられた棒切り欠き部を有したレンズ保持棒と、

上記レンズ、および、レンズ保持棒の両切り欠き部内に設けられていて、上記カメラ本体に装着された際に、カメラ本体の所定の部材と結合可能な連結部材と、を具備したことを特徴とする交換レンズ。

【請求項2】 上記レンズ切り欠き部及び上記棒切り欠き部は、撮影画面開口の短辺および、または長辺方向に沿って、少なくとも1か所に設けられていることを特徴とする請求項1記載の交換レンズ。

【請求項3】 上記連結部材は、上記カメラ本体と電気的に接続して情報のやり取りを行うマウント接点部材、または、上記交換レンズ内に設けられている絞りを駆動する絞り駆動部材であることを特徴とする請求項1記載の交換レンズ。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、交換レンズ、詳しくは、交換レンズにおいて、マウント部周りに配設される連結部材の配置構造に関する。

【0002】

【従来の技術】 従来、レンズ鏡筒における電気的連結部材の配置に関して提案されたものとして、特開平1-296205号公報に開示のレンズ鏡筒は、レンズ鏡筒内に配設される電気回路実装用のフレキシブル回路基板に関する提案である。また、特開平2-7593号公報に開示のフレキシブルアリント板は、交換レンズなどのレンズ駆動モータ等の電気部品へ接続されるフレキシブルアリント板に関するものである。

【0003】 上述の特開平1-296205号公報、または、特開平2-7593号公報に提案されたレンズ鏡筒内のフレキシブル回路基板の配置構造においては、その連結部材である接続用マウント側接点は、マウントに最も近い後玉棒の外側に配置されるように構成されている。

【0004】

【発明が解決しようとする課題】 上述の従来技術におけるレンズ鏡筒の後玉として比較的径の小さいレンズが適用されることから、後玉および後玉棒と上記マウント接点部材の位置が互いに干渉することはなかった。

【0005】 しかしながら、例えば、F N o. の非常に小さい大口径レンズ鏡筒においては、当然、後玉径も大きくなり、その際、マウント接点部材の位置によっては

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該マウント接点部材が、後玉棒あるいは後玉の配設位置と干渉し、大口径レンズ鏡筒のF N o. を最小限まで小さくすることができないという問題があった。

【0006】 本発明は、上述の不具合を解決するためになされたもので、その目的は、特に、大口径レンズの交換レンズにおいて、マウント接点部材、絞り駆動部材等の連結部材を効率よく配置し、大型化することのない交換レンズを提供することである。

【0007】

【課題を解決するための手段および作用】 本発明の交換レンズは、カメラ本体に着脱自在な交換レンズにおいて、フィルムへの結像に寄与する範囲以外の所定の部位に設けられたレンズ切り欠き部を有し、該レンズ切り欠き部が少なくとも上記カメラ本体と接続するレンズ側マウントに最も近いレンズに設けられたレンズ光学系と、上記レンズ光学系の切り欠き部に対応する位置に設けられた棒切り欠き部を有したレンズ保持棒と、上記レンズ、および、レンズ保持棒の両切り欠き部内に設けられていて、上記カメラ本体に装着された際に、カメラ本体の所定の部材と結合可能な連結部材を具備している。上記交換レンズにおいては、上記レンズマウント側のレンズ、および、レンズ保持棒の両棒切り欠き部内の設けられた連結部材によりカメラ本体の所定の部材の結合ができる。

【0008】

【実施例】 以下、図を用いて本発明の実施例を説明する。まず、本発明の第1実施例を示すカメラ本体に着脱自在な交換レンズについて説明する。図1は、上記第1実施例の交換レンズのマウント周りの半断面図である。

30 また、図2は、上記交換レンズのマウント側から見た、後玉棒と接点部材周りの斜視図である。本実施例の交換レンズは、F N o. の小さい大口径レンズであって、レンズ光学系のうちレンズ側マウントに最も近いレンズである後玉レンズ1の外形が外棒に近くに位置するものとする。

【0009】 上記図1に示すように上記後玉レンズ1は、レンズ保持棒としての後玉棒11に挿入された最も後側、すなわち、カメラ本体側に配設される。該後玉棒11には、この他に2枚のレンズがその前側に挿入されている。また、該後玉棒11とともに被写体側へ繰り出される移動棒3は、図示せぬカム機構によって駆動される。

【0010】 上記交換レンズのレンズ側マウントとしてのレンズマウント4は、固定棒B6に対してスペーサ7を挟んだ状態でネジ止めされており、図示せぬカメラ本体側マウントと結合可能とする。上記スペーサ7は、交換レンズのf c調整（焦点調整）を行うための部材であって、種々の板厚のものが用意されている。固定棒A8は、図示はしていないが先端部に向かってカム溝が切られ、図示しないカムリングのカム溝と共に上記移動棒3

を繰り出す動きをする。

【0011】また、上記図1に示すように上記レンズマウント4にネジ止め、あるいは、接着により固定されている連結部材としてのマウント接点部材10は、縦縁体の樹脂部10bの中に接点ピン10aをインサート成形して形成されている。上記交換レンズ内の回路との接続用であるフレキシブルプリント基板12は、一方の端部12aが上記マウント接点ピン10aの端部にハング付により導通可能に固定されている。他の方の端部12bは、交換レンズ内の回路に接続されている。

【0012】上記図2の本実施例の交換レンズの後玉枠11とマウント接点部材10の斜視図に示すように、後玉レンズ1は、その一部をD字形状にカッティング部1aにてカッティングされている。このD字形状のカッティング処理は、ガラスのレンズにおいては、レンズの芯取り後に行うものとすれば、レンズの芯がカッティングされていない外周(1b)に対しては精度よく出るので都合が良い。もちろんプラスチック製のレンズの場合には成形によってカッティング部1aを形成しても構わない。上記後玉枠11も上記後玉レンズ1のカッティング部1aに対応した位置に切り欠き部11aが設けられている。この切り欠き部11aは、旋盤加工によって枠が製作された後、フライス加工により削り取って形成される。

【0013】上記後玉レンズ1は、上記後玉枠11に対して接着等により固定される。そして、前記マウント接点部材10は、この後玉レンズ1のカッティング部1aの下部であって、後玉枠11の両切り欠き部11a内に形成された空間に位置するよう上記レンズマウント4に固定される。

【0014】図3は、本実施例の交換レンズにおいて、上記後玉レンズ1、後玉枠11、マウント接点部材10をレンズマウント5の方向から見た図である。後玉枠11には後玉レンズ1を挿入し、位置決めするための胴付部11cが後玉レンズ1の嵌合径11bより1段小さい内径で形成されている。上記図3から解るように後玉レンズ1には、前述したカッティング部1aがあり、後玉枠11にも切り欠き部11aが設けられているので、後玉レンズ1は、その全周が後玉枠11の胴付部11c上には当接しないことになる。しかし、図3に示すように約270°の範囲で胴付部11cと当接し、上記後玉レンズ1の取り付け傾き等の問題はまず発生しない。

【0015】図4は、後玉レンズ1とフィルム面17の間の光線を後述する撮影画面の開口部であるフィルムマスク面の長辺側からと、短辺側からの2通りについて、光軸Oに対して垂直な方向から見た光路図を示し、図5は、後玉レンズ部をフィルム面側から見た場合の略図を示す。

【0016】なお、フィルムマスク面15は、図5に示すように高さ2×aである短辺15a、長さ2×bの長

辺15bをもつ長方形とする。なお、図4、図5における後玉レンズ1は、その外周面を1bで示し、カッティング部1aが形成される前の形状を示している。また、上記図4において、符号19は、長辺15aに到達する光線とそれに沿う光線の分布範囲を示し、符号20は、短辺15bに到達する光線とそれに沿う光線の分布範囲を示している。

【0017】上記フィルムマスク面15の長方形上に集まる光は、後玉レンズ1の後面1cにおいては図5に示すように樽形の形状の上記到達光の範囲13を通過する。そして、該範囲13の内、フィルムマスク面15の短辺15a側に集まる光線の境界部は、符号13aで示され、長辺15b側に集まる光線の境界部は、符号13bで示される。

【0018】上記図4、図5から解るように、フィルムマスク面15が長方形の場合には後玉レンズ1におけるフィルムマスク面15に到達する光線の通過範囲13は、上述のように樽形形状になるため、樽形形状のより外側は必ずしもレンズ面である必要はない。したがって、上記樽形形状の長辺側の外の部分に対応して、カッティング線1aの位置で後玉レンズ1をカッティングし、そのカッティングスペースに対応する図5の2点鎖線で囲まれる範囲10A内にマウント接点部材10を配設する。

【0019】以上のように構成された本実施例の交換レンズにおいては、マウント接点部材10と干渉する位置にある、後玉枠11を該マウント接点部材10と干渉させないように切り欠き、後玉レンズ1もカッティング線1aに沿ってD字形状にカッティングする。そのように切り欠くことによってできた空きスペースにマウント接点部材10を配置する。このことによって、後玉レンズが大きいFN_oの小さな大口径レンズの交換レンズであっても、鏡筒を外側に広げることなく、また、撮影された画面に影響を与えない状態でマウント接点部材10を配置することができ、小型でコンパクトな交換レンズを提供することができる。

【0020】次に、本発明の第2実施例を示すカメラ本体に着脱自在な交換レンズについて説明する。図6は、本実施例の交換レンズのマウント周りの半断面図であり、図7は、本実施例の交換レンズの後玉枠と絞り駆動用レバー周りの斜視図である。本実施例の交換レンズもFN_oの小さい大口径レンズが適用されており、後玉枠11がマウント4の内径近辺まで位置している。なお、上記図6、図7、また、後述する図8において、前記第1実施例のものと同一の構成部材については、該第1実施例にて付したものと同一の符号を適用する。

【0021】本実施例の交換レンズにおいては、カメラ本体から絞り駆動力を伝達されるものであって、交換レンズ中心部付近に位置する絞りを駆動するための連結部材である絞り駆動用レバー18が配設されており、その

レバー18の前側(被写体側)の端部18aの先端が図示しない絞りに接続されている。

【0022】該絞り駆動用レバー18は、図6、図7に示すように交換レンズ鏡筒内からカメラ本体側へ向かってマウント部から突出させる必要がある。しかし、従来の方法によると、カッティング部のない後玉レンズが大きい交換レンズの場合は、該後玉レンズ用の後玉枠の外形が2点鎖線で示す範囲11d(図6参照)付近まで位置している。したがって、絞り駆動用レバー18を上記レンズマウント4の内径と上記後玉枠の外径の間を通してカメラ本体側へ突出させることができない。そこで、本実施例においては、後玉レンズ1は、上記図7に示すようにカッティング部1aでカッティングされ、さらに、後玉枠11は、後玉レンズ1のカッティング部1aに対応した範囲を切り欠いて切り欠き部11aを形成している。絞り駆動用レバー18は、この後玉レンズ1のカッティング部1aと後玉枠11の切り欠き部11aによって形成されたスペースを通って交換レンズ後端に向かって突出させることができる。なお、上記絞り駆動用レバー18以外の構成は、前記第1実施例のものとほぼ同じである。

【0023】図8は、上記絞り駆動用レバー18の回転運動範囲θと、後玉レンズ1のカッティング部1aおよび後玉枠11の切り欠き部11aの位置関係を示した図である。上記図8に示すように絞り駆動用レバー18は光軸を中心として角度θだけ回転運動を行うので、後玉レンズ1のカッティング部1aと後玉枠11の切り欠き部11aによって形成されるスペースは、この回転運動の範囲よりも僅かに広くしておく。

【0024】以上説明したように本実施例の交換レンズによれば、後玉枠の切り欠き部11aに回転運動を行う絞り駆動用レバー18を配置せしめることによって、後玉レンズ1が大きく、FNo.の小さな大口径レンズであっても、鏡筒を外側に広げることなく、また、撮影された画面に影響を与えない状態で絞り駆動用レバー18を配置することができ、小型でコンパクトな交換レンズを提供することができる。なお、上記絞り駆動用レバーに代えて他の駆動操作部材を配設するようにしてもよい。

【0025】次に、本発明の第3実施例としてのカメラ本体に着脱自在な交換レンズについて説明する。図9は、上記実施例の交換レンズをマウント側から見た図である。本実施例の交換レンズもFNo.が小さく、後玉レンズの外形も前記実施例のものと同様に大型のものとする。なお、本実施例の交換レンズにおいても、同一構成部材については前記第1、2実施例のものに付した符号と同一の符号を用いる。

【0026】上記交換レンズにおけるレンズ光学系のうちレンズマウント側に最も近いレンズである後玉レンズ21には、上記図9に示すようにカッティング部21a

が光軸Oに対して略対称位置に2ヶ所あり、後玉枠31の切り欠き部31aもカッティング部21aの位置に対応して2ヶ所設けられている。

【0027】上述のようにカッティング部21a、切り欠き部31aを設けることによって、本実施例の交換レンズでは、レンズ鏡筒内からレンズマウント後方へ突出する部材を2ヶ所に配置することができる。例えば、上記図9に示すように、同図の下側には前記第1実施例の交換レンズで示した連結部材としてのマウント接点部材10を配置し、上側には前記第2実施例の交換レンズで示した連結部材としての絞り駆動用レバー18を配置することができる。

【0028】後玉レンズ21は、上述のように2ヶ所のカッティング部21aによって、略対称な位置をカッティングされているが、上記図9に示す程度に後玉レンズ21の外周21bが中心に対して対称な位置に残されており、後玉レンズ21は、後玉枠31に対しての位置決めが可能であり、後玉レンズ21の位置的な精度上の問題は生じない。

【0029】図10は、前述の第3実施例の交換レンズの後玉レンズの変形例の形状を示す。この変形例においては、後玉レンズ41のカッティング部41aが図10に示すように3ヶ所に及んでいる。このカッティングにより、レンズ鏡筒内からレンズ側マウント後方へ突出する連結部材を3ヶ所に配置することができる。後玉レンズ41の後玉枠に対する位置決めについては、レンズ外周41bが図示したように略円周3等分の方向の3ヶ所にあるため、図示しない後玉枠に対して精度よく位置決めすることができる。

【0030】本変形例のレンズにあっては、前記第1、2実施例のものと比較し、やはり、FNo.の小さい大口径のレンズであっても、レンズ鏡筒の外形を大型化することなく3種類の連結部材、例えば、操作レバーやマウント接点部材等をレンズ側マウント側に配設可能となる。

【0031】なお、今まで説明した第1、2、3実施例の交換レンズにおいて、後玉レンズのカッティングはすべて直線状に行ったものとして示したが、そのスペースに配置する部材の形状、あるいは、加工のコストの点から違う形状にカッティングしても良く、例えば、曲線状にカッティングをしてもよく、更なる効果を得ることができる。

【0032】

【発明の効果】本発明の請求項1に記載の交換レンズにおいては、交換レンズ鏡筒内のレンズ光学系の複数のレンズのうち、レンズ側マウントに最も近いレンズの一部を切り欠き、また、レンズ保持枠にも棒切り欠き部を設け、これらの切り欠き部によってできたスペースに連結部材を配置するようにしたので、交換レンズ鏡筒内のスペースを効率よく使うことができ、レンズ鏡筒外形を

必要以上に大型化することが避けられ、小型でコンパクトな交換レンズを提供することができる。

【0033】本発明の請求項2に記載の交換レンズにおいては、上記請求項1に記載の交換レンズのレンズ光学系のマウント側に近いレンズ、および、そのレンズ保持棒の切り欠きが少なくとも1箇所に設けられており、その部分に連結部材を配設し、レンズ鏡筒の大型化を避けることができる。

【0034】本発明の請求項3に記載の交換レンズにおいては、上記請求項1に記載の交換レンズにおける切り欠き部によってできたスペースにマウント接点部材、または、絞り駆動部材を配置することによって、レンズ鏡筒の大型化を避けることが可能になる。

【図面の簡単な説明】

【図1】本発明の第1実施例を示す交換レンズのマウント周りの半断面図。

【図2】上記図1の交換レンズのマウント側から見た、後玉枠と接点部材周りの斜視図。

【図3】上記図1の交換レンズにおいて、後玉レンズ、後玉枠、マウント接点部材をレンズマウント側から見た図。

【図4】図1の交換レンズにおいて、後玉レンズとフィルム面間の光線をフィルムマスク面の長辺側からと短辺側からの2通りについて、光軸に対して垂直な方向から見た光路図。

【図5】図1の交換レンズにおいて、後玉レンズをフィ

ルム面側から見た略図。

【図6】本発明の第2実施例を示す交換レンズのマウント周りの半断面図。

【図7】上記図6の交換レンズのマウント側から見た、後玉枠と接点部材周りの斜視図。

【図8】上記図6の交換レンズにおいて、絞り駆動用レバーの回転運動範囲と、後玉レンズのカッティング部および後玉枠の切り欠き部の位置関係を示した図。

【図9】本発明の第3実施例を示す交換レンズをマウント側から見た図。

【図10】上記第3実施例の交換レンズにおける後玉レンズの変形例としての後玉レンズの形状を示す図。

【符号の説明】

1, 21, 41………後玉レンズ（レンズ光学系のうち、レンズマウント側に最も近いレンズ）

1a, 21a, 41a………カッティング部（レンズ切り欠き部）

10 ………マウント接点部材（連結部材）

10a ………マウント接点ピン（連結部材）

11, 31………レンズ保持枠

11a, 31a………枠切り欠き部

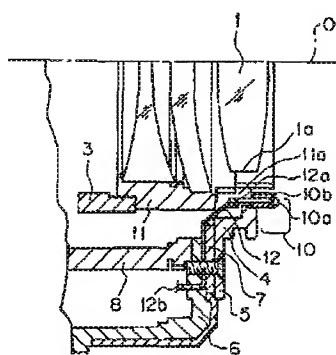
15 ………フィルムマスク（撮影画面の開口）

15a ………フィルムマスク面短辺

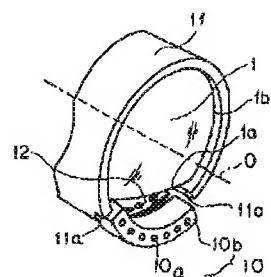
15b ………フィルムマスク面長辺

18 ………絞り駆動レバー（連結部材）

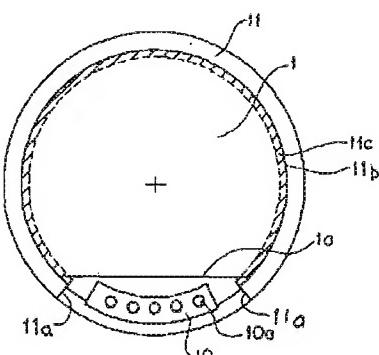
【図1】



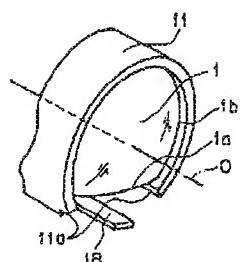
【図2】



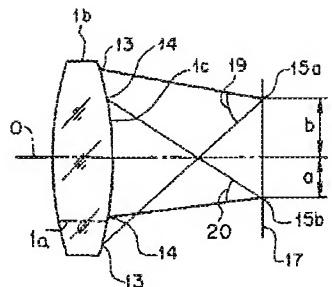
【図3】



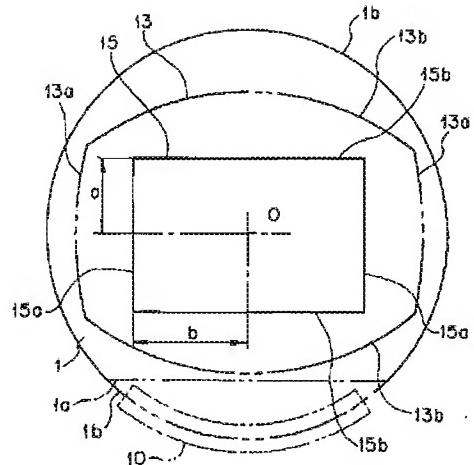
【図7】



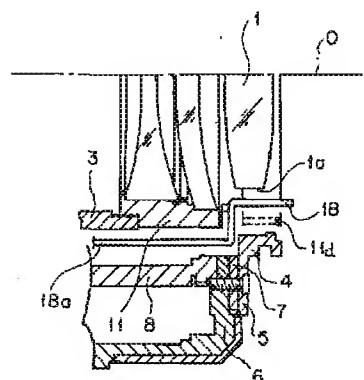
【図4】



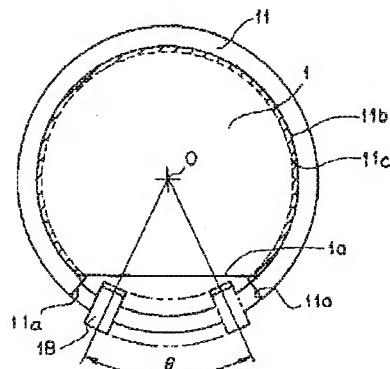
【図5】



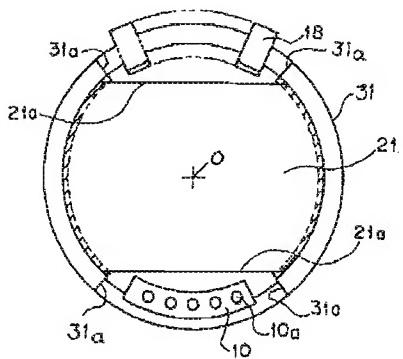
【図6】



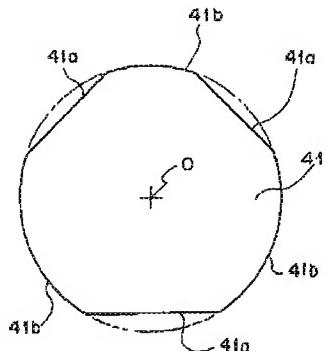
【図8】



【図9】

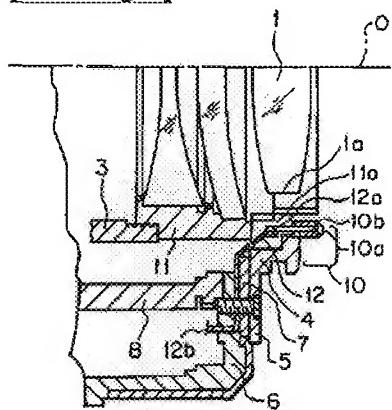


【図10】

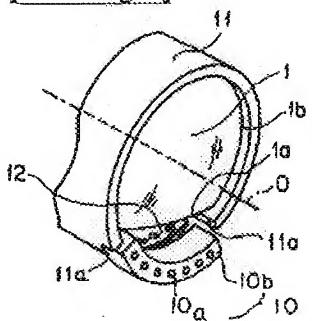


DRAWINGS

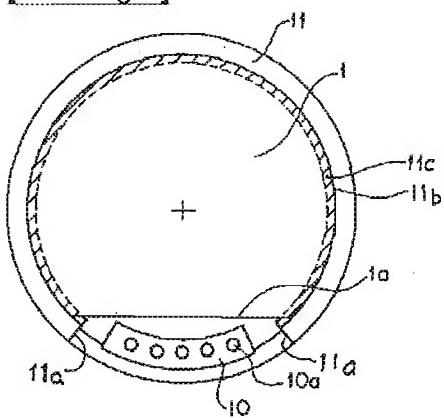
[Drawing 1]



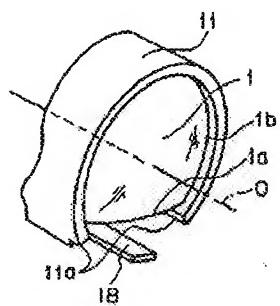
[Drawing 2]



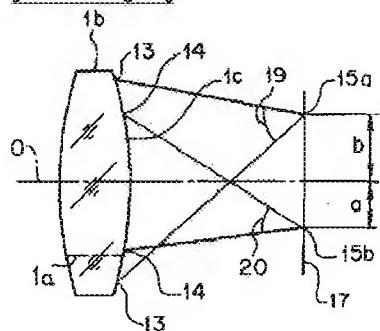
[Drawing 3]



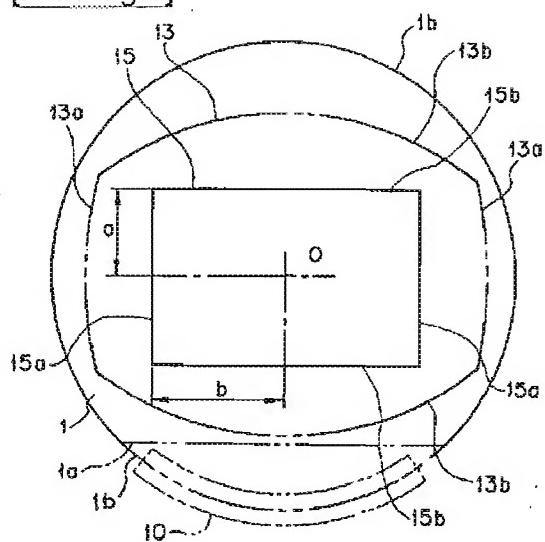
[Drawing 7]



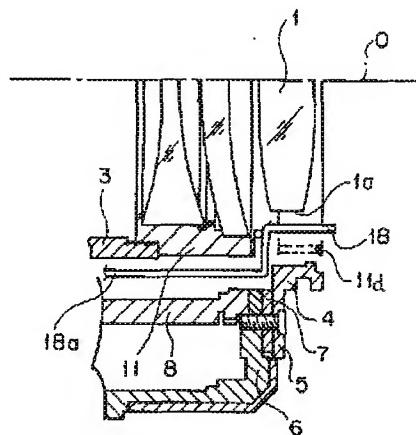
[Drawing 4]



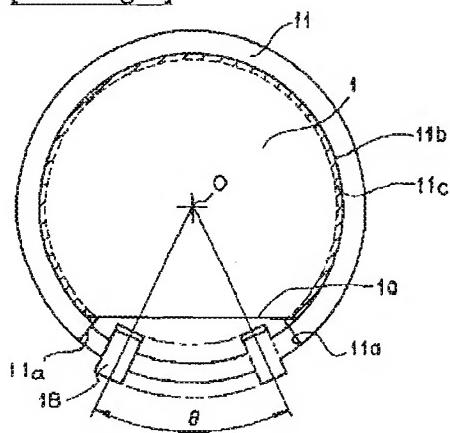
[Drawing 5]



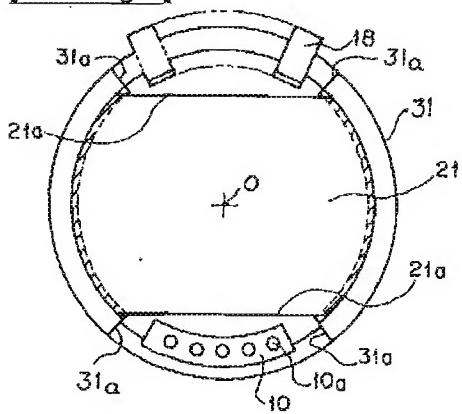
[Drawing 6]



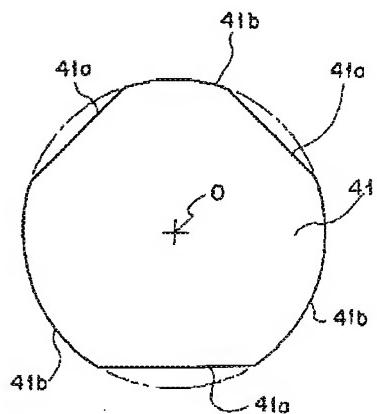
[Drawing 8]



[Drawing 9]



[Drawing 10]



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3. In the drawings, any words are not translated.

DETAILED DESCRIPTION

[Detailed Description of the Invention]**[0001]**

[Industrial Application] This invention relates to the arrangement structure of an interchangeable lens and the connecting member allocated in the circumference of a mount part in an interchangeable lens in detail.

[0002]

[Description of the Prior Art] Conventionally, the lens barrel of the indication to JP,1-296205,A is a proposal about the flexible circuit board for electric circuit mounting allocated in a lens barrel as what was proposed about arrangement of the electric connecting member in a lens barrel. The flexible printed board of the indication to JP,2-7593,A is related with the flexible printed board connected to electrical parts, such as lens drive motors, such as an interchangeable lens.

[0003] In the arrangement structure of the flexible circuit board in the lens barrel proposed by above-mentioned JP,1-296205,A or JP,2-7593,A, the mount side point of contact for connection which is the connection member is constituted so that it may be arranged at the outside of the back lens mounting rim nearest to mount.

[0004]

[Problem(s) to be Solved by the Invention] Since the lens with a path comparatively small as a back ball of the lens barrel in above-mentioned conventional technology was applied, the position of a back ball and a back lens mounting rim, and the above-mentioned mount contact member did not interfere mutually.

[0005] However, in the very small lens-of-large-diameter body tube of FNo. for example, Naturally, it became large, and at that time, depending on the position of a mount contact member, this mount contact member interfered also in the back ball diameter with the arranging position of the back lens mounting rim or the back ball, and it had the problem that

FNo. of a lens-of-large-diameter body tube could not be made small to the minimum.

[0006]Made in order that this invention might solve above-mentioned fault, the purpose is to provide the interchangeable lens which arranges efficiently connecting members, such as a mount contact member and a diaphragm driving member, and does not enlarge them in the interchangeable lens of a lens of large diameter in particular.

[0007]

[Means for Solving the Problem and its Function]In an interchangeable lens which can detach and attach an interchangeable lens of this invention freely to a camera body, A lens optical system provided in a lens nearest to lens side mount which has the lens notch section provided in predetermined parts other than a range which contributes to image formation to a film, and this lens notch section connects with the above-mentioned camera body at least, When it is provided in both notch sections of a lens holding frame with a frame notch section provided in a position corresponding to a notch section of the above-mentioned lens optical system, and the above-mentioned lens and a lens holding frame and the above-mentioned camera body is equipped, a predetermined member of a camera body and a combinable connecting member are provided. In the above-mentioned interchangeable lens, combination of a predetermined member of a camera body can be performed by a provided connecting member in a lens by the side of the above-mentioned lens mount, and both frame notch section of a lens holding frame.

[0008]

[Example]Hereafter, the example of this invention is described using figures. First, the interchangeable lens which can be freely detached and attached to the camera body in which the 1st example of this invention is shown is explained. Drawing 1 is a half section figure of the circumference of mount of the interchangeable lens of the 1st example of the above. Drawing 2 is the perspective view of the circumference of a back lens mounting rim and a contact member seen from the mount side of the above-mentioned interchangeable lens. The outside of the back ball lens 1 which the interchangeable lens of this example is a small lens of large diameter of Fno., and is a lens nearest to lens side mount among lens optical systems shall be located in the neighborhood at an outer frame.

[0009]As shown in above-mentioned drawing 1, the after-above ball lens 1 is allocated in the very back, i.e., camera body, side inserted in the back lens mounting rim 11 as a lens holding frame. In addition to this, two lenses are inserted in this back lens mounting rim 11 at the front side. The movable frame 3 which it lets out to the photographic subject side with this back lens mounting rim 11 is driven according to the cam mechanism which is not illustrated.

[0010]Where the spacer 7 is inserted to fixed frame B6, the screw stop of the lens mount 4 as lens side mount of the above-mentioned interchangeable lens is carried out.

The camera body side mount which is not illustrated and combination are enabled.

The above-mentioned spacer 7 is a member for performing fc adjustment (focus control) of an interchangeable lens, and the thing of various board thickness is prepared. Although the graphic display has not been carried out, a cam groove is cut toward a tip part, and the fixed frame A8 serves to let out the above-mentioned movable frame 3 with the cam groove of the cam ring which is not illustrated.

[0011]In the resin part 10b of an insulator, the mount contact member 10 as a connecting member currently fixed to the above-mentioned lens mount 4 by a screw stop or adhesion as shown in above-mentioned drawing 1 carries out insert molding of the point pin 10a, and is formed. With solder, as for the flexible printed circuit board 12 which is an object for connection with the circuit in the above-mentioned interchangeable lens, one end 12a is being fixed to the end of the above-mentioned mount point pin 10a so that a flow is possible. One of other ends 12b are connected to the circuit in an interchangeable lens.

[0012]As shown in the back lens mounting rim 11 of the interchangeable lens of this example of above-mentioned drawing 2, and the perspective view of the mount contact member 10, the back ball lens 1 is cut by the cutting portion 1a in the shape of D type in the part. If it shall carry out after core picking of a lens in the lens of glass, since it comes out with sufficient accuracy to the periphery (1b) into which the core of the lens is not cut, cutting processing of the shape of this D type is convenient. Of course, in the case of the lens made from a plastic, the cutting portion 1a may be formed with shaping. The notch section 11a is formed in the position corresponding to the cutting portion 1a of the after-above ball lens 1 also in the after-above lens mounting rim 11. After a frame is manufactured by engine-lathe processing, this notch section 11a is shaved off with milling, and is formed.

[0013]The after-above ball lens 1 is fixed by adhesion etc. to the after-above lens mounting rim 11. And said mount contact member 10 is the lower part of the cutting portion 1a of the ball lens 1 after this, and it is fixed to the above-mentioned lens mount 4 so that it may be located in the space formed in both the notch sections 11a of the back lens mounting rim 11.

[0014]Drawing 3 is the after-above ball lens 1, the back lens mounting rim 11, and the figure that looked at the mount contact member 10 from the direction of the lens mount 5 in the interchangeable lens of this example. The abutting-joint part 11c for inserting and positioning the back ball lens 1 is formed in the back lens mounting rim 11 with the inside diameter smaller one step than the diameter 11b of fitting of the back ball lens 1. Since there is the cutting portion 1a mentioned above in the back ball lens 1 so that above-mentioned drawing 3 may show, and the notch section 11a is formed also in the back lens mounting rim 11, as for the back ball lens 1, the perimeter will not contact on the abutting-joint part 11c of the back lens mounting rim 11. However, as shown in drawing 3, the abutting-joint part 11c is contacted in about 270 degrees, and problems, such as attachment inclination of the after-above ball lens 1, are not generated probably.

[0015] Drawing 4 shows the optical-path figure from the long side side of the film mask side which is an opening of the photography screen which mentions the beam of light between the back ball lens 1 and the film plane 17 later seen from the vertical direction to the optic axis O about two kinds from the shorter side side, and drawing 5 shows the schematic illustration at the time of seeing a back ball lens part from the film plane side.

[0016] Let the film mask side 15 be a rectangle with the shorter side 15a which is height 2xa as shown in drawing 5, and the long side 15b of length 2xb. The back ball lens 1 in drawing 4 and drawing 5 shows the peripheral face by 1b, and shows the shape before the cutting portion 1a is formed. In above-mentioned drawing 4, the numerals 19 show the range of the beam of light which arrives at the long side 15a, and the beam of light in alignment with it, and the numerals 20 show the range of the beam of light which reaches the shorter side 15b, and the beam of light in alignment with it.

[0017] The light which gather on the rectangle of the above-mentioned film mask side 15 passes the range 13 of the above-mentioned attainment light of the shape of a barrel shape, as the rear face 1c of the back ball lens 1 is shown in drawing 5. And the boundary part of a beam of light which gather for the shorter side 15a side of the film mask side 15 among these ranges 13 is shown by the numerals 13a, and the boundary part of a beam of light gathering in the long side 15b side is shown by the numerals 13b.

[0018] Since the passage range 13 of the beam of light which arrives at the film mask side 15 in the back ball lens 1 becomes barrel shape shape as mentioned above when the film mask side 15 is a rectangle so that above-mentioned drawing 4 and drawing 5 may show, the outside of barrel shape-shaped one does not necessarily need to be a lens side. Therefore, corresponding to the portion of the outside by the side of the long side of the above-mentioned barrel shape shape, the mount contact member 10 is allocated in the range 10A which cuts the back ball lens 1 in the position of the cutting line 1a, and is surrounded by the two-dot chain line of drawing 5 corresponding to the cutting space.

[0019] In the interchangeable lens of this example constituted as mentioned above, notching and the back ball lens 1 also cut the back lens mounting rim 11 in the mount contact member 10 and the position in which it interferes in the shape of D type along the KATINGU line 1a so that it may not be made to interfere with this mount contact member 10. It cuts such and the mount contact member 10 is arranged to the made free space by lacking. By this, even if a back ball lens is an interchangeable lens of the small lens of large diameter of large FNo., Without extending a body tube outside, the mount contact member 10 can be arranged in the state where the photoed screen is not affected, and a small and compact interchangeable lens can be provided.

[0020] Next, the interchangeable lens which can be freely detached and attached to the camera body in which the 2nd example of this invention is shown is explained. Drawing 6 is a half

section figure of the circumference of mount of the interchangeable lens of this example, and drawing 7 extracts as the back lens mounting rim of the interchangeable lens of this example, and is a perspective view of the circumference of the lever for a drive. As for the interchangeable lens of this example, the small lens of large diameter of FNo. is applied, and the back lens mounting rim 11 is located to the inside diameter neighborhood of the mount 4. In above-mentioned drawing 6, drawing 7, and drawing 8 mentioned later, the same numerals as what was attached in this 1st example are applied to the same members forming as the thing of said 1st example.

[0021]It is what it extracts from a camera body and driving force is transmitted to in the interchangeable lens of this example, The lever 18 for a diaphragm drive which is a connecting member for driving the diaphragm located near the interchangeable lens central part is allocated, and it is connected to the diaphragm which the tip of the end 18a by the side of front [of the lever 18] (photographic subject side) does not illustrate.

[0022]It is necessary to make this lever 18 for a diaphragm drive project from a mount part toward the camera body side out of an interchangeable lens body tube, as shown in drawing 6 and drawing 7. However, when a back ball lens without a cutting portion is a large interchangeable lens according to the conventional method, the outside of the back lens mounting rim for these back ball lenses is located to near the range of 11d (refer to drawing 6) shown according to a two-dot chain line. Therefore, the lever 18 for a diaphragm drive cannot be made to project to the camera body side through between the inside diameter of the above-mentioned lens mount 4, and the outer diameters of an after-above lens mounting rim. Then, in this example, the back ball lens 1 is cut by the cutting portion 1a, as shown in above-mentioned drawing 7, and further, the back lens mounting rim 11 cuts and lacks the range corresponding to the cutting portion 1a of the back ball lens 1, and forms the notch section 11a. The lever 18 for a diaphragm drive can be made to project toward the interchangeable lens back end through the space formed after this of the cutting portion 1a of the ball lens 1, and the notch section 11a of the back lens mounting rim 11. The composition of those other than the above-mentioned lever 18 for a diaphragm drive is almost the same as the thing of said 1st example.

[0023]Drawing 8 is a figure showing the physical relationship of the rotational movement range theta of the above-mentioned lever 18 for a diaphragm drive, the cutting portion 1a of the back ball lens 1, and the notch section 11a of the back lens mounting rim 11. By extracting, as shown in above-mentioned drawing 8, since only the angle theta rotates centering on an optic axis, the lever 18 for a drive makes slightly the space formed of the cutting portion 1a of the back ball lens 1, and the notch section 11a of the back lens mounting rim 11 larger than the range of this rotational movement.

[0024]By making the lever 18 for a diaphragm drive which performs rotating motion to the

notch section 11a of a back lens mounting rim arrange, as explained above according to the interchangeable lens of this example, Without extending a body tube outside, even if the back ball lens 1 is large and it is a small lens of large diameter of FNo., it can extract to the photoed screen in the state where it is not affected, the lever 18 for a drive can be arranged, and a small and compact interchangeable lens can be provided. It replaces with the above-mentioned lever for a diaphragm drive, and may be made to allocate other driving operation members.

[0025]Next, the interchangeable lens which can be freely detached and attached to the camera body as the 3rd example of this invention is explained. Drawing 9 is the figure which looked at the interchangeable lens of the above-mentioned example from the mount side. The interchangeable lens of this example also has small Fno., and let the outside of a back ball lens as well as the thing of said example be a large-sized thing. Also in the interchangeable lens of this example, the same numerals as the numerals given to the thing of said the 1st and 2 example are used about an identical configuration member.

[0026]On the back ball lens 21 nearest to the lens mount side which is a lens, among the lens optical systems in the above-mentioned interchangeable lens. As shown in above-mentioned drawing 9, as for the notch section 31a of those with two place, and the back lens mounting rim 31, the two cutting portions 21a are formed in the abbreviated position of symmetry to the optic axis O corresponding to the position of the cutting portion 21a.

[0027]With the interchangeable lens of this example, the member which projects from the inside of a lens barrel to lens mount back can be arranged to two places by forming the cutting portion 21a and the notch section 31a as mentioned above. For example, as shown in above-mentioned drawing 9, to the figure down side, the mount contact member 10 as a connecting member shown with the interchangeable lens of said 1st example can be arranged, and the lever 18 for a diaphragm drive as a connecting member shown with the interchangeable lens of said 2nd example can be arranged to the up side.

[0028]The periphery 21b of the back ball lens 21 is left behind to the symmetric position to the center to such an extent that it is shown in above-mentioned drawing 9, although the back ball lens 21 is having the abbreviated symmetric position cut by the two cutting portions 21a as mentioned above.

Positioning to the back lens mounting rim 31 is possible for the back ball lens 21, and it does not produce the problem of the position accuracy of the back ball lens 21.

[0029]Drawing 10 is ***** about the shape of the modification of the back ball lens of the interchangeable lens of the 3rd above-mentioned example. In this modification, as the cutting portion 41a of the back ball lens 41 shows drawing 10, it has amounted to three places. By this cutting, the connecting member which projects from the inside of a lens barrel to lens-side-

mount back can be arranged to three places. About positioning to the back lens mounting rim of the back ball lens 41, since it is in three places of the direction of approximate circle circumference 3 division into equal parts as the lens periphery 41b illustrated, it can position with sufficient accuracy to the back lens mounting rim which is not illustrated.

[0030]If it is in the lens of this modification, even if it is a lens of the small large caliber of Fno. too as compared with the thing of said the 1st and 2 example, allocation to the lens-side-mount side is attained in three kinds of connecting members, for example, a control lever, a mount contact member, etc., without enlarging the outside of a lens barrel.

[0031]Although the interchangeable lens of the 1st, 2, and 3 example explained until now was shown as what carried out all cuttings of the back ball lens to linear shape, cutting into the shape of the member arranged to the space, or the shape which is different from a point of the cost of processing, for example, cutting in the shape of a curve, and acquiring the further effect -- it can **.

[0032]

[Effect of the Invention]In the interchangeable lens of this invention according to claim 1, Some lenses nearest to lens side mount among two or more lenses of the lens optical system in an interchangeable lens body tube Notching, Since the connecting member was arranged to the space which provided the frame notch section also in the lens holding frame, and was made by these notch sections at it, The space in an interchangeable lens body tube can be used efficiently, enlarging lens barrel outside type more than needed is avoided, and it can provide a small and compact interchangeable lens.

[0033]In the interchangeable lens of this invention according to claim 2, The lens near the mount side of the lens optical system of the interchangeable lens of a statement and notching of the lens holding frame are provided in at least one place at above-mentioned claim 1, a connecting member can be allocated in the portion, and enlargement of a lens barrel can be avoided.

[0034]In the interchangeable lens of this invention according to claim 3, it becomes possible to avoid enlargement of a lens barrel by arranging a mount contact member or a diaphragm driving member to the space made to above-mentioned claim 1 by the notch section in the interchangeable lens of a statement.

[Translation done.]